



ARACON[®]
brand metal clad fiber

A LIGHTWEIGHT SOLUTION FOR
SHIELDING AND CONDUCTING

MICRO-COAX[®]
Leading the way in transmission line solutions.

EMI Shielding

ARACON® fibers braided into a shield or sock offer superior performance against electromagnetic interference. Advantages include:

More uniform coverage:

■ The textile-like properties of ARACON fibers contribute to extremely effective, uniform shield coverage. The large number of very fine fibers, together with the tendency of yarn bundles to flatten and spread, makes it easy to obtain high coverage levels with reduced windowing. Ease of pushback is maintained even at high coverage.

Better high frequency shielding:

■ The fine ARACON fibers provide a very high surface-to-volume ratio. Together with the excellent coverage, the extra surface yields improved high-frequency EMI shield performance. For low frequencies, a hybrid of metal wire and ARACON fibers can offer good performance with weight savings.

Reduced weight:

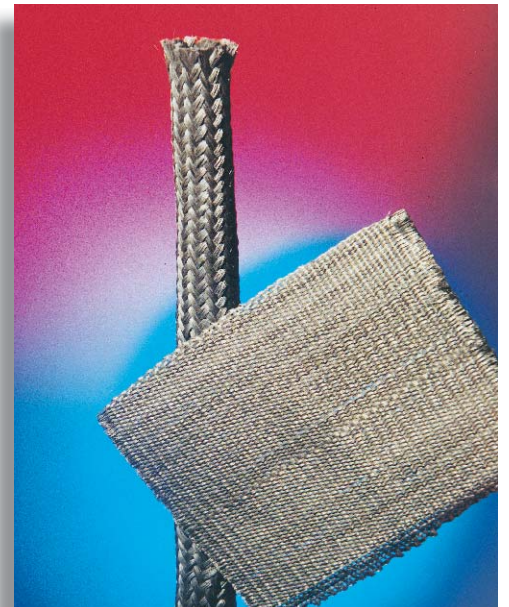
■ In a typical case, such as coaxial cable, switching to ARACON fibers allowed a weight savings of 60% in the braid, which translated to an overall reduction in cable weight of 26%. Weight savings can be especially important in aerospace and similar applications where every ounce counts.

Flexibility:

■ Braid made from ARACON fibers has successfully replaced copper braid in military applications where ease of movement and durability were critical.

Compatibility:

■ Yarns of ARACON fibers are fully compatible with standard braiding equipment. Shields made with ARACON fibers can be terminated by soldering or with band connectors.





Conducting

ARACON fibers excel in low current circuits where weight and strength are critical. Compared to metal wires, ARACON fibers effectively replace a portion of the metal with aramid. The aramid contributes strength but increases resistance. Depending on design requirements, you can reduce resistance by shifting to a slightly larger gauge conductor of ARACON while still retaining weight and strength benefits. Advantages of ARACON fibers as conductors include:

- **Strength:** The break strength of ARACON conductors is nearly three times that of copper.
- **Durability:** The flexibility and strength of the aramid core means that conductors of ARACON fibers will hold up in high-vibration, high-stress applications.
- **Termination reliability:** Crimping tests with 22D contacts confirmed that conductors of ARACON can be crimped with standard tools and contacts. There was no work hardening of the crimped clad fibers as is normally seen with crimped copper. Conductors of ARACON broke outside the crimped connectors rather than pulling out or breaking at the interface like copper.

Properties of ARACON® conductors

Conductors of ARACON are made up of many very fine fibers twisted together into a yarn. ARACON metal clad fibers are aromatic polyamides, whose structure gives ARACON its unique combination of very high tensile strength, chemical resistance and thermal stability. Individual ARACON fibers are only 16 microns in diameter, which enables yarns of exceptional flexibility and textile-like processing. Application-specific yarns are realized by varying the number of filaments per bundle, the types and amounts of cladding metals, and the levels of twist. Compared to other conductors, products made from ARACON fibers excel in many key areas.

Greater strength with less weight

The density of aramid fibers is only 1.4 g/cc, compared to copper at 8.9 g/cc. Even with the addition of metal coatings, the density of ARACON fibers increases to only 3.0 to 4.0 g/cc. At the same time, the tensile strength of the aramid core (350 Ksi) is from three to ten times higher than that of traditional or high-strength copper cores (35-95 Ksi).

Flexibility that never tires

Since ARACON fibers are textile-like at heart, they offer a “hand” or feel that is far more flexible and compliant than metal. And, in a side-by-side flexibility test, copper wire broke after 50 flexes, while ARACON fiber was still going strong when the test was stopped at 10,000 flexes.

Stability and compatibility

Aramid fibers have dramatically improved thermal stability compared to commodity fibers such as nylon and polyester. ARACON maintains its strength both at elevated temperatures and under cryogenic conditions. The moduli of aramids are in the same range as common conductor metals, which make aramids ideal substrates for cladding with conductor metals. Thermal cycling tests show no increase in resistance, confirming the excellent adhesion of metal to aramid.

Electrical/mechanical properties tailored for your needs

A wide range of properties is available by varying the metal cladding type and thickness and the base fiber size. Strands from 38 AWG to larger than 24 AWG can be made from single or multiple bundles of ARACON. Fiber resistance can be tailored from 100 to greater than 500,000 ohms per thousand feet.



Standard ARACON Grades

Grade	Finish	DC Resistance (Q/1000 ft.)	Weight (lbs/1000 ft.)
XN0200E-025	Nickel	2300	0.053
XN0400E-018	Nickel	1000	0.107
XN0400EF-018	Nickel	700	0.130
XS0400E-018	Silver	850	0.107

Available now

After more than a decade of testing and refinement, ARACON® fibers are now available and qualified in high reliability applications.

If you have been waiting for a high-performance conductor or shield – one with greater strength and flexibility at a reduced weight- investigate the high performance qualities of ARACON. Your Micro-Coax representative can provide specifications and performance data for individual product grades to help you make your selection.

For more information, call MICRO-COAX® at **1-800-223-2629.**

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The strength of KEVLAR® brand fiber with the conductivity of metals

What if there were fibers that were stronger than steel? More flexible and lighter than copper? And good conductors of electricity?

Presenting Micro-Coax ARACON® brand metal-clad fibers. This product, available only from Micro-Coax, combines the conductivity of an outer metal coating with the strength, lightweight and flexibility of aramid fibers.

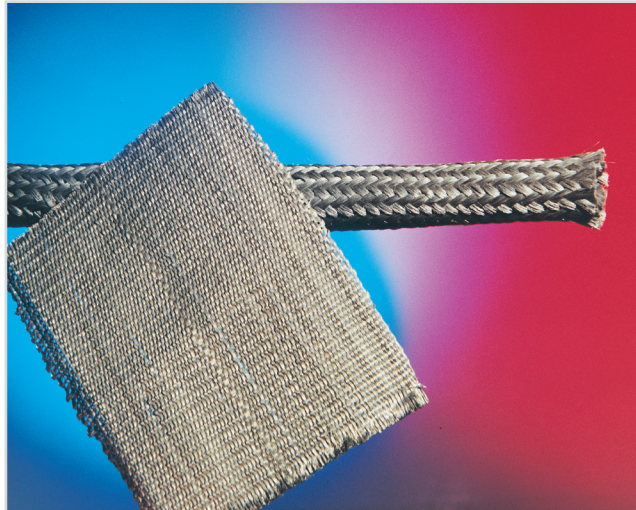
ARACON fibers are based on the same technology that created KEVLAR®, well known for its use in bullet-resistant vests, high-speed boats and military helmets. With the addition of nickel, copper and silver coatings of varying thickness, ARACON fibers provide a versatile combination of physical and electrical properties for a variety of demanding applications.

Applications

ARACON metal clad fibers have been applied to a number of applications where the strength, flexibility and lightweight of the aramid base and the electrical conductivity of the metal cladding provide unique advantages in solving engineering problems. Two applications- EMI shielding and specialized conducting- stand out as excellent opportunities for the unique properties of ARACON fibers.



ARACON[®] EMI/RFI Tubular Braided Shielding



ARACON brand metal clad fibers are once again available in tubular braided EMI shielding. Available only from Micro-Coax, ARACON brand metal-clad fibers combine the conductivity of an outer metal coating with the strength, light weight and flexibility of genuine KEVLAR[®] fibers.

ARACON offers excellent performance in high-vibration, high-stress applications. When braided into a shield, ARACON offers superior performance against electromagnetic and radio frequency interference (EMI/RFI) with weight savings of up to 80% over conventional metal braiding.

ARACON braids are offered with silver plating and nickel plating depending upon the application. Also available are blends of nickel plated ARACON with nickel plated copper wire to enable more shielding at lower frequencies while offering substantial weight savings compared to traditional copper overbraid.

Typical EMI problem areas behind connectors and backshells can easily be shielded with ARACON tubular braids. Multiple sizes are available to shield problem areas on the ends of cables / harnesses where additional EMI shielding is necessary to meet demanding specifications.

Standard sizes from are available now in diameters ranging from 0.62" ID to 2.00" ID. Our engineers can also work to tailor a special size for your difficult application.

When your EMI shielding application requires significant weight reduction at a cost effective price, turn to the proven solution - ARACON.

Micro-Coax, Inc.

Nickel Plated Composite ARACON® EMI/RFI Tubular Braided Shielding



Nominal I.D. Inches (mm)	Micro-Coax Item Number	Cross-Reference Part Number	Wire Bundle Accommodation Range Ref Inches (mm)		Approximate Weight Per 100 Feet		Approximate Weight of Copper Alternative (Pounds/100ft)
			Minimum	Maximum	Grams	Pounds	
0.062 (1.6)	330178	103-009-002	0.048 (1.2)	0.093 (2.4)	36.300	0.080	0.400
0.125 (3.2)	330176	103-009-004	0.090 (2.3)	0.250 (6.4)	100.000	0.220	1.030
0.250 (6.4)	330181	103-009-008	0.125 (3.2)	0.375 (9.5)	180.000	0.396	3.450
0.375 (9.5)	330183	103-009-012	0.187 (4.8)	0.562 (14.3)	230.000	0.506	3.950
0.500 (12.7)	330185	103-009-016	0.250 (6.4)	0.750 (19.1)	370.000	0.814	4.770
0.625 (15.9)	330187	103-009-020	0.437 (11.1)	0.875 (22.2)	440.000	0.968	5.940
0.750 (19.1)	330189	103-009-024	0.500 (12.7)	1.000 (25.4)	520.000	1.144	7.050
1.000 (25.4)	330191	103-009-032	0.875 (22.2)	1.250 (31.8)	800.000	1.760	7.500
1.250 (31.8)	330193	103-009-040	1.000 (25.4)	1.500 (38.1)	1000.000	2.200	9.380
1.500 (38.1)	330195	103-009-048	1.375 (34.9)	1.875 (47.6)	1520.000	3.340	11.250

Additional Information

1. Material - Nickel plated KEVLAR®
2. Braid angle all sizes 15-25 degrees

ARACON® is a registered trademark of Micro-Coax, Inc.
KEVLAR® is a registered trademark of E.I. du Pont de Nemours and Company

Silver Plated Composite ARACON® EMI/RFI Tubular Braided Shielding



Nominal I.D. Inches (mm)	Micro-Coax Item Number	Cross-Reference Part Number	Wire Bundle Accommodation Range Ref Inches (mm)		Approximate Weight Per 100 Feet		Approximate Weight of Copper Alternative (Pounds/100ft)
			Minimum	Maximum	Grams	Pounds	
0.062 (1.6)	330177	103-009-002S	0.048 (1.2)	0.093 (2.4)	43.560	0.096	0.400
0.125 (3.2)	330179	103-009-004S	0.090 (2.3)	0.250 (6.4)	120.000	0.264	1.030
0.250 (6.4)	330180	103-009-008S	0.125 (3.2)	0.375 (9.5)	216.000	0.475	3.450
0.375 (9.5)	330182	103-009-012S	0.187 (4.8)	0.562 (14.3)	276.000	0.607	3.950
0.500 (12.7)	330184	103-009-016S	0.250 (6.4)	0.750 (19.1)	444.000	0.977	4.770
0.625 (15.9)	330186	103-009-020S	0.437 (11.1)	0.875 (22.2)	528.000	1.160	5.940
0.750 (19.1)	330188	103-009-024S	0.500 (12.7)	1.000 (25.4)	624.000	1.373	7.050
1.000 (25.4)	330190	103-009-032S	0.875 (22.2)	1.250 (31.8)	960.000	2.112	7.500
1.250 (31.8)	330192	103-009-040S	1.000 (25.4)	1.500 (38.1)	1200.000	2.640	9.380
1.500 (38.1)	330194	103-009-048S	1.375 (34.9)	1.875 (47.6)	1824.000	4.008	11.250

Additional Information

1. Material - Silver plated KEVLAR®
2. Braid angle all sizes 15-25 degrees

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Type XN0200E-025 (Shielding Grade)

ARACON[®] XN0200E-025 represents a new class of conductive yarn intended for braided EMI shielding in cables and harnesses, especially where weight savings is important. The textile-like qualities and flexibility of ARACON fibers are unique in conductive products, making high coverage easy to obtain without the stiffness or loss of push-back capability inherent to metal wire overbraiding. Since ARACON fibers are built on a modified KEVLAR[®] base, the yarns have very high strength as well as good thermal and dimensional stability. Exceptional strength and textile-like handling also can permit faster braiding speed vs. metal wire products.

As with other materials, shielding effectiveness with ARACON fiber is dependent on details of cable design. When braided or woven, the natural tendency for the fine, lightweight fibers is to spread out for high coverage, typically greater than 95%. This translates into superior shielding effectiveness vs. copper wire, and the potential for significant weight savings. Also, the outstanding strength and processibility of ARACON yarns uniquely permits them to be braided directly with metal wire products as well. Such "hybrid" shielding can have tailored electrical performance advantages in addition to weight savings and increased strength.

Type XN0200E-025 has the following general features:

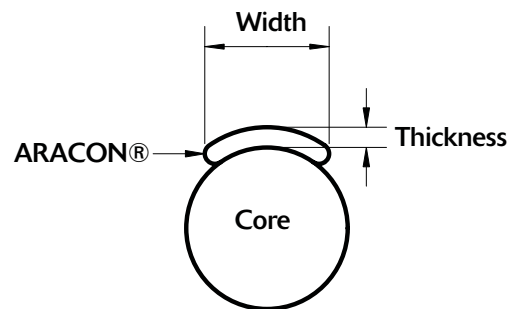
- Nickel-clad for maximum thermal stability .
- Weighs 60% less than copper wire at equal volume.
- Construction equivalent to 89 bunched stranded ends of 54 AWG wire.
- Can be braided on same equipment used for metal wire.
- Can be soldered or crimped.
- Available on 3,000 ft. Wardwell spools or 2,000 ft. Butt braider bobbins.

Typical Properties

The following data is based on testing of sampled production of this product. Please contact the factory for minimum/maximum values or additional performance variables.

Data: XN0200E-025

Braided Bundle Dimensions (see diagram)	
Width	0.014" (0.36mm)
Thickness	0.0015" (0.038mm)
Yarn Weight	0.053 lbs/K ft. (0.079 kg/km)
Yarn DC Resistance, 20°C	2,300 ohms/K ft. (7,550 ohms/km)
Break Load	6 lbs.
Operating Temperature Range	-65°C to 200°C



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L004R01



Type XN0400E-018 (Shielding Grade)

ARACON[®] XN0400E-018 represents a new class of conductive yarn intended for braided EMI shielding in cables and harnesses, especially where weight savings is important. The textile-like qualities and flexibility of ARACON fibers are unique in conductive products, making high coverage easy to obtain without the stiffness or loss of push-back capability inherent to metal wire overbraiding. Since ARACON fibers are built on a modified KEVLAR[®] base, the yarns have very high strength as well as good thermal and dimensional stability. Exceptional strength and textile-like handling also can permit faster braiding speed vs. metal wire products.

As with other materials, shielding effectiveness with ARACON fiber is dependent on details of cable design. When braided or woven, the natural tendency for the fine, lightweight fibers is to spread out for high coverage, typically greater than 95%. This translates into superior shielding effectiveness vs. copper wire, and the potential for significant weight savings. Also, the outstanding strength and processibility of ARACON yarns uniquely permits them to be braided directly with metal wire products as well. Such "hybrid" shielding can have tailored electrical performance advantages in addition to weight savings and increased strength.

Type XN0400E-018 has the following general features:

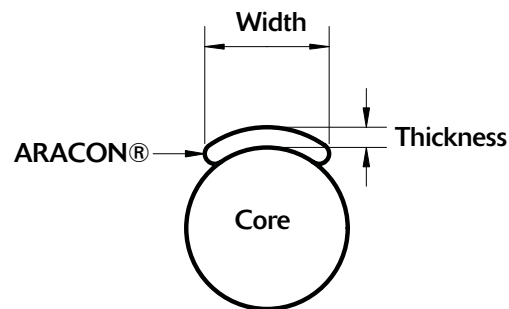
- Nickel-clad for maximum thermal stability.
- Weighs 60% less than copper wire at equal volume.
- Construction equivalent to 178 bunched stranded ends of 54 AWG wire.
- Can be braided on same equipment used for metal wire.
- Can be soldered or crimped.
- Available on 3,000 ft. Wardwell spools or 2,000 ft. Butt braider bobbins.

Typical Properties

The following data is based on testing of sampled production of this product. Please contact the factory for minimum/maximum values or additional performance variables.

Data: XN0400E-018

Braided Bundle Dimensions (see diagram)	
Width	0.022" (0.56mm)
Thickness	0.003" (0.076mm)
Yarn Weight	0.107 lbs/K ft. (0.159 kg/km)
Yarn DC Resistance, 20°C	1,000 ohms/K ft. (3,280 ohms/km)
Break Load	15 lbs.
Operating Temperature Range	-65°C to 200°C



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L001R01



Type XN0400EF-018 (Salt Fog Resistance)

ARACON[®] XN0400EF-018 represents a new class of conductive yarn intended for braided EMI shielding in cables and harnesses, especially where weight savings is important. The textile-like qualities and flexibility of ARACON fibers are unique in conductive products, making high coverage easy to obtain without the stiffness or loss of push-back capability inherent to metal wire overbraiding. Since ARACON fibers are built on a modified KEVLAR[®] base, the yarns have very high strength as well as good thermal and dimensional stability. Exceptional strength and textile-like handling also can permit faster braiding speed vs. metal wire products.

As with other materials, shielding effectiveness with ARACON fiber is dependent on details of cable design. When braided or woven, the natural tendency for the fine, lightweight fibers is to spread out for high coverage, typically greater than 95%. This translates into superior shielding effectiveness vs. copper wire, and the potential for significant weight savings. Also, the outstanding strength and processibility of ARACON yarns uniquely permits them to be braided directly with metal wire products as well. Such "hybrid" shielding can have tailored electrical performance advantages in addition to weight savings and increased strength.

Type XN0400EF-018 has the following general features:

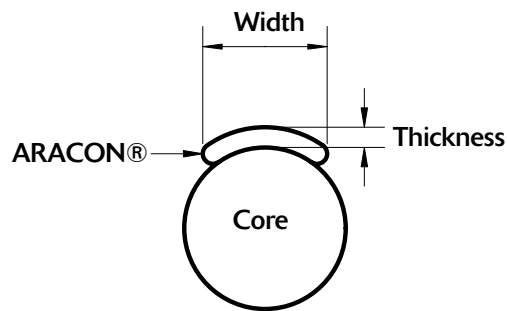
- Nickel-clad for maximum stability to salt fog and thermal exposure.
- Weighs 55% less than copper wire at equal volume.
- Construction equivalent to 178 bunched stranded ends of 53 AWG wire.
- Can be braided on same equipment used for metal wire.
- Can be soldered or crimped.
- Available on 3,000 ft. Wardwell spools or 2,000 ft. Butt braider bobbins.

Typical Properties

The following data is based on testing of sampled production of this product. Please contact the factory for minimum/maximum values or additional performance variables.

Data: XN0400EF-018

Braided Bundle Dimensions (see diagram)	
Width	0.022" (0.56mm)
Thickness	0.003" (0.076mm)
Yarn Weight	0.130 lbs/K ft. (0.194 kg/km)
Yarn DC Resistance, 20°C	700 ohms/K ft. (2,300 ohms/km)
Break Load	15 lbs.
Operating Temperature Range	-65°C to 200°C



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L002R01



Type XS0200E-025 (Shielding Grade)

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As with other materials, shielding effectiveness with ARACON fibers is dependent on details of cable design. When braided or woven, the natural tendency for the fine, lightweight fibers is to spread out for high coverage, typically greater than 95%. This translates into superior shielding effectiveness vs. copper wire, and the potential for significant weight savings. Also, the outstanding strength and processibility of ARACON yarns uniquely permits them to be braided directly with metal wire products as well. Such "hybrid" shielding can have tailored electrical performance advantages in addition to weight savings and increased strength.

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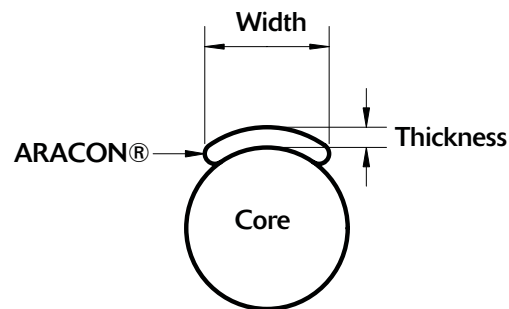
- Silver-clad for maximum conductivity and solderability.
- Weighs 60% less than copper wire at equal volume.
- Construction equivalent to 89 bunched stranded ends of 54 AWG wire.
- Can be braided on same equipment used for metal wire.
- Can be soldered or crimped.
- Available on 3,000 ft. Wardwell spools or 2,000 ft. Butt braider bobbins.

Typical Properties

The following data is based on testing of sampled production of this product. Please contact the factory for minimum/maximum values or additional performance variables.

Data: XS0200E-025

Braided Bundle Dimensions (see diagram)	
Width	0.014" (0.36mm)
Thickness	0.0015" (0.038mm)
Yarn Weight	0.053 lbs/K ft. (0.079 kg/km)
Yarn DC Resistance, 20°C	1,950 ohms/K ft. (6,400 ohms/km)
Break Load	6 lbs.
Operating Temperature Range	-65°C to 200°C



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L005R01



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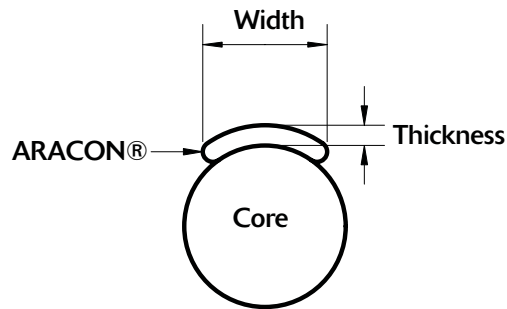
- Silver-clad for maximum conductivity and solderability.
- Weighs 60% less than copper wire at equal volume.
- Construction equivalent to 178 bunched stranded ends of 54 AWG wire.
- Can be braided on same equipment used for metal wire.
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Typical Properties

The following data is based on testing of sampled production of this product. Please contact the factory for minimum/maximum values or additional performance variables.

Data: XS0400E-018

Braided Bundle Dimensions (see diagram)	
Width	0.022" (0.56mm)
Thickness	0.003" (0.076mm)
Yarn Weight	0.107 lbs/K ft. (0.159 kg/km)
Yarn DC Resistance, 20°C	850 ohms/K ft. (2,800 ohms/km)
Break Load	15 lbs.
Operating Temperature Range	-65°C to 200°C



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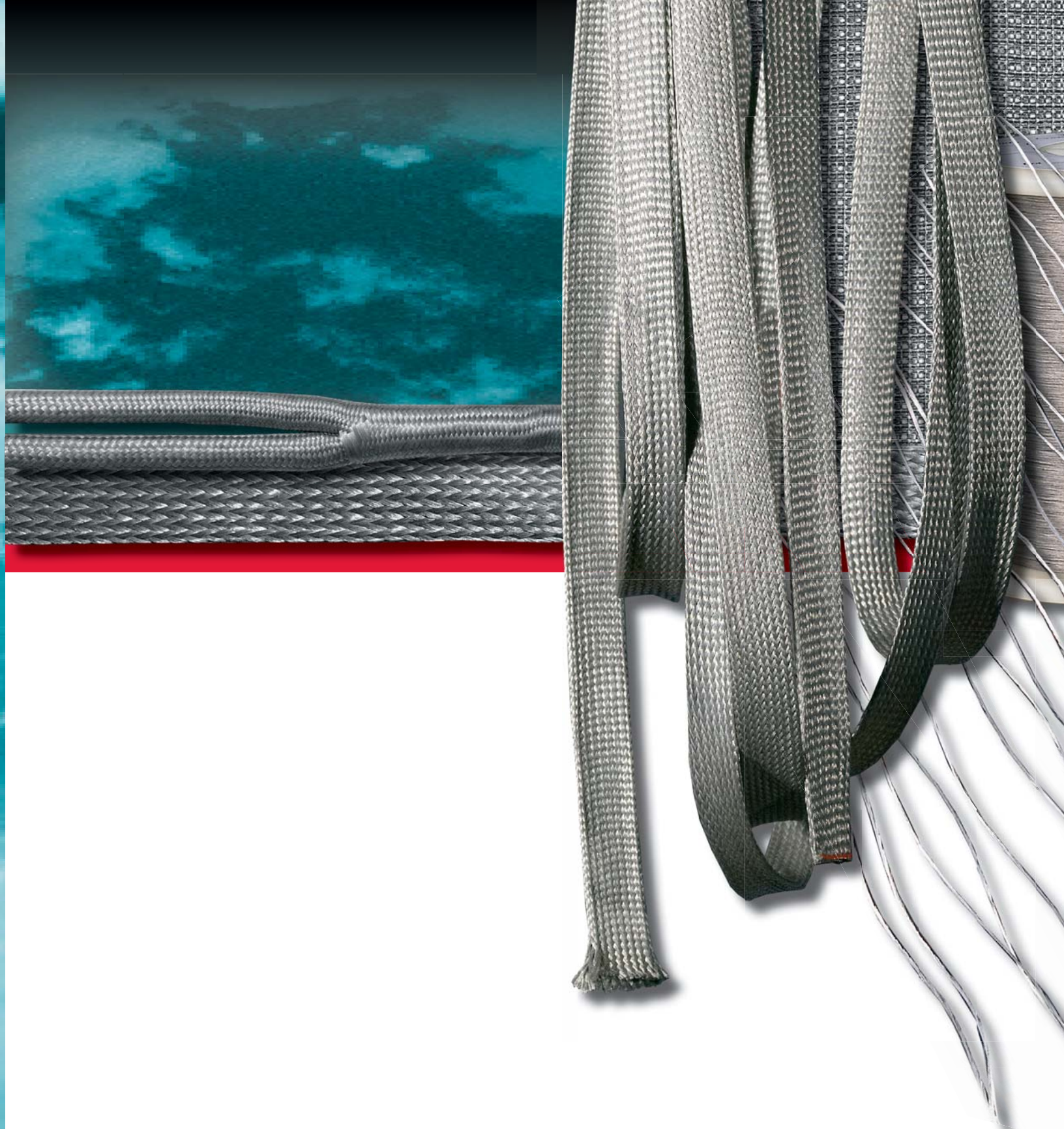
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L003R01



MICRO-COAX[®]

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